6th International Conference on Nanotechnologies and Biomedical Engineering
Proceedings of ICNBME-2023, September 20–23, 2023, Chisinau, Moldova
Volume 2: Biomedical Engineering and New Technologies for Diagnosis, Treatment, and Rehabilitation

Measurement of Biokinetic Parameters with the CvMob Program at the Level of the Lower Limb with a Functional 3D Printed Knee Orthosis

Alexandru-Constantin Tulică, Ileana-Constanţa Roşca, Corneliu-Nicolae Drugă, Ionel Şerban

https://doi.org/10.1007/978-3-031-42782-4_14

Abstract

The aim of this research is to evaluate the kinematic parameters, velocity and acceleration at the knee joint during flexion and extension using a functional 3D printed knee brace. For this purpose, the Contemplas system was used together with the CvMob program to record and analyze knee movements in real time.

The subject wore a functional knee brace that was activated at an angle of 30°. The Contemplas system recorded images of the knee motion during flexion and extension, and the CvMob program was used to analyze the kinematic parameters through discrete graphics.

The obtained results revealed significant changes in the kinematic parameters of the knee during the use of the functional knee orthosis. The velocity of knee flexion and extension was assessed and plotted in distinct graphs, highlighting changes in knee joint motion. Acceleration was also measured and analyzed in the context of orthosis use.

The Contemplas system and the CvMob program provided an efficient way to record and analyze knee movements, allowing a detailed assessment of knee joint performance.

This research demonstrates the importance of using the functional 3D printed knee orthosis, together with the Contemplas system and the CvMob program, in assessing and improving kinematic parameters, velocity and acceleration at the knee joint. These results

can be applied in the development of personalized rehabilitation and therapy strategies for patients with knee conditions and injuries, with the aim of improving the functionality and mobility of the joint.

Keywords: biokinetic parameters, CvMob program, knee joints, knee braces

References

1. Palastanga, N., Field, D., Soames, R.: Anatomy and Human Movement – Structure and Function, 4th ed. (2002)
2. CvMob., https://sites.google.com/site/cvmobufba/home/
3. Home – CONTEMPLAS., https://contemplas.com/en/motion-analysis /
4. Hardware-Multi-Camera Systems – Contemplas. https://contemplas.com/en/hardware-multicamera-systems/
5. Lusardi, M.M., Jorge,M., Nielsen, C.: Orthotics&Prosthetics in Rehabilitation, 3rd ed. (2013)